I Claim:

1. Apparatus for testing a directional responding acoustic device, comprising:

(a) at least first and second sound sources adapted to be placed in first and second positions respectively relative to said device,

(b) at least one signal generator coupled to said first and second sound sources for generating a first audio signal applied to said first sound source and a second audio signal simultaneously applied to said second sound source, said first and second sound sources generating simultaneous first and second acoustical signals in response to said first and second audio signals applied thereto,

(c) said first and second audio signals and hence said first and second acoustical signals each containing a plurality of orthogonal components, the components of said first audio signal being different from the components of said second audio signal,

(d) and an analyzer adapted to be coupled to said device and synchronized with said generator, for analyzing the response of said device to said first and second acoustical signals.

2. Apparatus according to claim 1 wherein said components are sinusoids.

3. Apparatus according to claim 1 and including an acoustic receiver located adjacent said device for receiving said first and second acoustic signals, said analyzer being connected to said acoustic receiver, said analyzer being connected to said signal generator for controlling said signal generator.

4. Apparatus according to claim 1, 2 or 3 wherein said analyzer includes a receiver coupled to said device, and a processor coupled to said receiver for analyzing the response of said device to said first and second acoustic signals.

5. Apparatus according to claim 1, 2 or 3 and including at least one further sound source coupled to said signal generator, said signal generator generating a third audio signal for application to said third sound source.

6. Apparatus according to claim 1 wherein said components of said first audio signal comprise first sinusoids which are first bin frequencies of a first Discrete Fourier Transform ("DFT"), and said components of said second audio signal comprise second sinusoids which are second bin frequencies of a second DFT, said first and second DFTs being the same or one DFT being an integer multiple of the other DFT, each of said first bin frequencies being different from all of said second bin frequencies.

7. Apparatus according to claim 6 wherein said first and second DFTs are the same DFT.

8. Apparatus according to claim 7 wherein said first audio signal comprises even bin frequencies and said second audio signal comprises odd bin frequencies of said DFT.

9. Apparatus according to claim 1, 2 or 3 wherein said device is a directional hearing aid.

10. Apparatus according to claim 9 wherein the bandwidth of each of said audio signals extends from approximately 200 Hz to approximately 8 kHz.

11. A method for testing a directional responding acoustic device, comprising:

(a) generating at least first and second audio signals each containing a plurality of components, the components of said first audio signal being different from the components of said second audio signal and being orthogonal thereto,

(b) applying said first and second audio signals to first and second sound sources respectively to produce first and second acoustical signals,

(c) exposing said device simultaneously to said first and second acoustical signals to produce a received signal,

(d) and analyzing the response of said device to said first and second acoustical signals.

12. A method according to claim 11 and including providing a controlling acoustic receiver adjacent said device to provide a control signal, and utilizing said control signal to control the generation of said first and second audio signals.

13. A method according to claim 12 wherein said control signal is applied to a signal analyzer and said audio signals are produced by a signal generator, said method including using said signal analyzer to control said signal generator and synchronizing said signal analyzer and said signal generator.

14. A method according to claim 13 wherein said components of said first and second audio signals are sinusoids.

15. A method according to claim 14 wherein the step of analyzing comprises converting said received signal to the frequency domain using a DFT, and then separating the bin frequencies of said first and second audio signals in said received signal.

16. A method according to claim 11, 12, 13 or 14 wherein each of said first and second audio signals is a broadband audio signal.

17. A method according to claim 11, 12, 13 or 14 wherein said device is a directional hearing aid.